FIG. 1

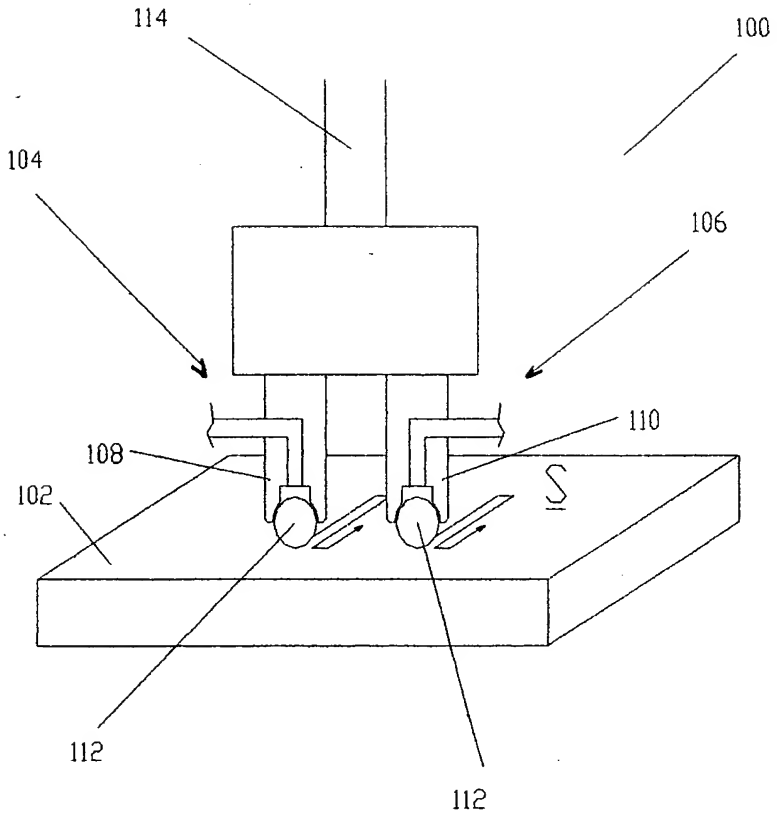


FIG. 2

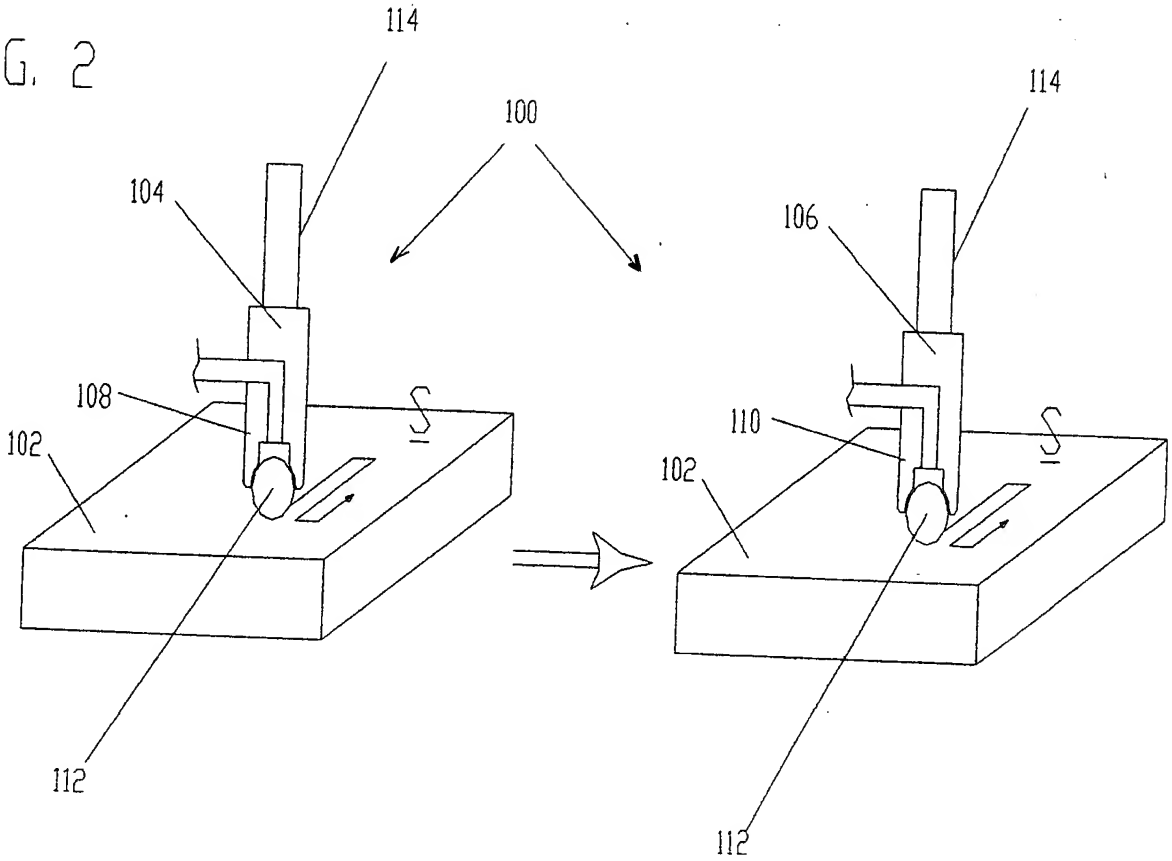


FIG. 3

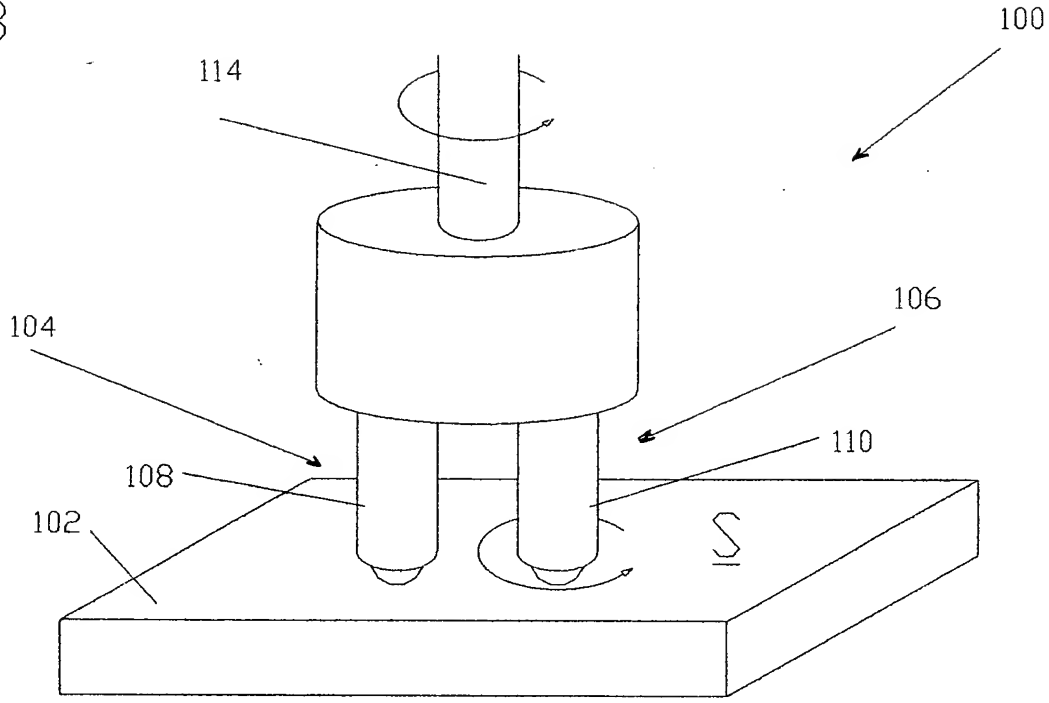


FIG. 4

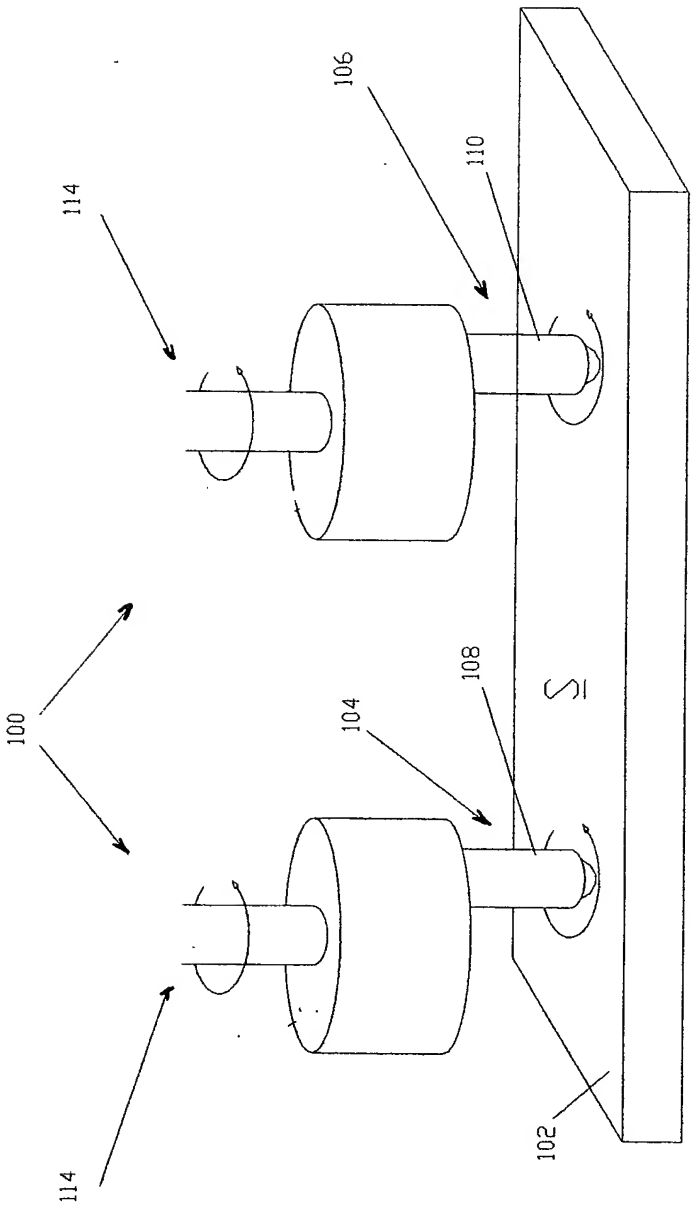


FIG. 5

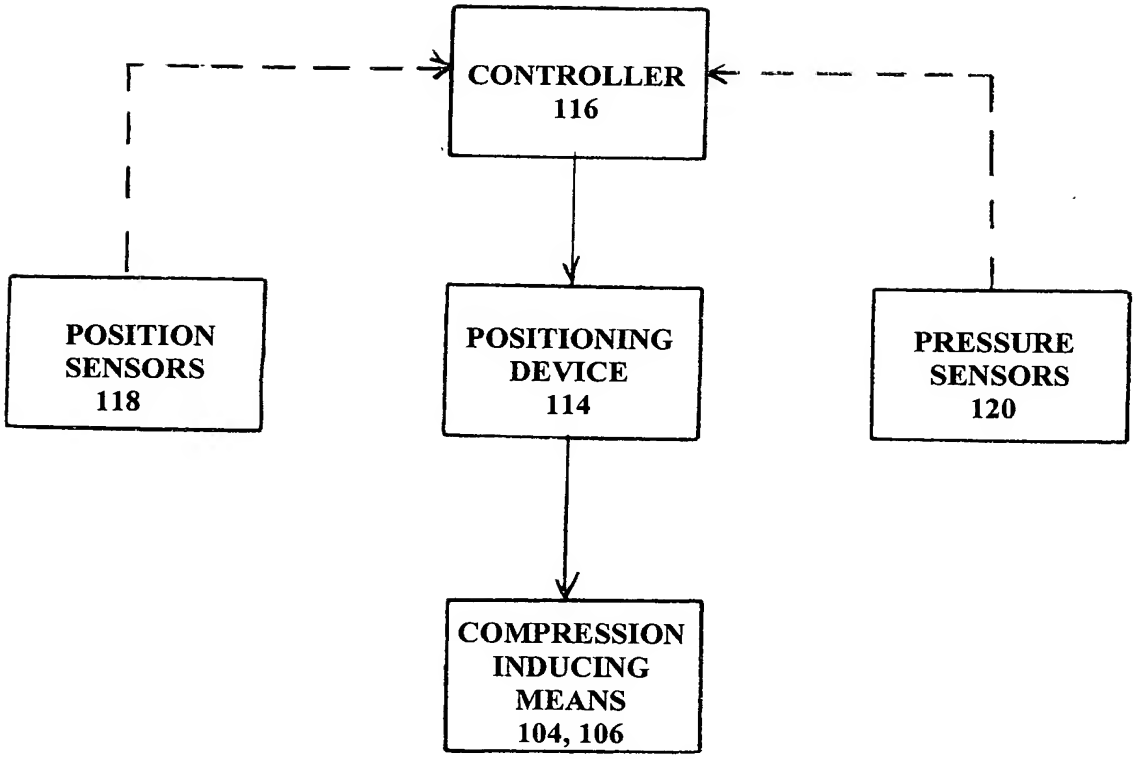
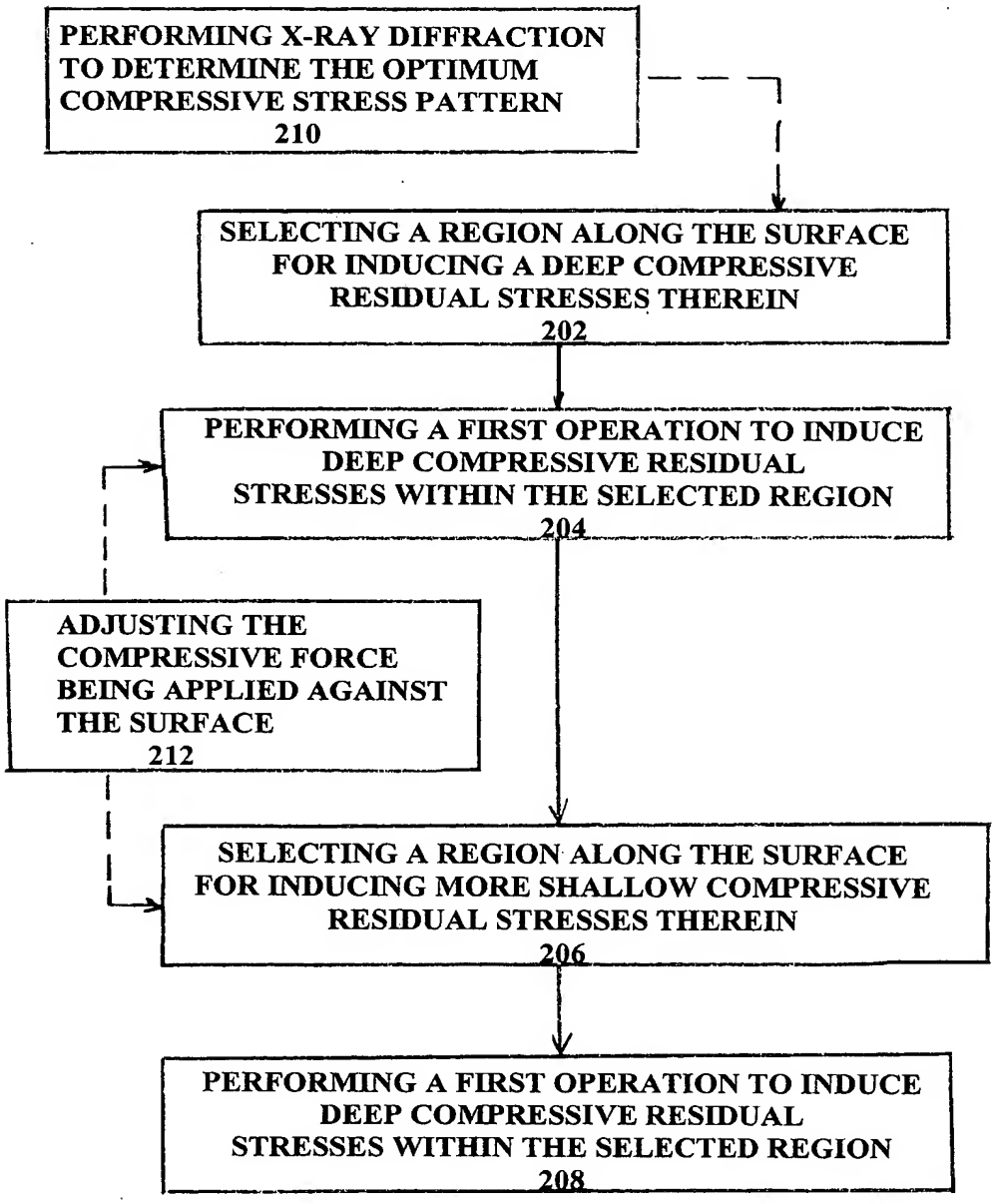
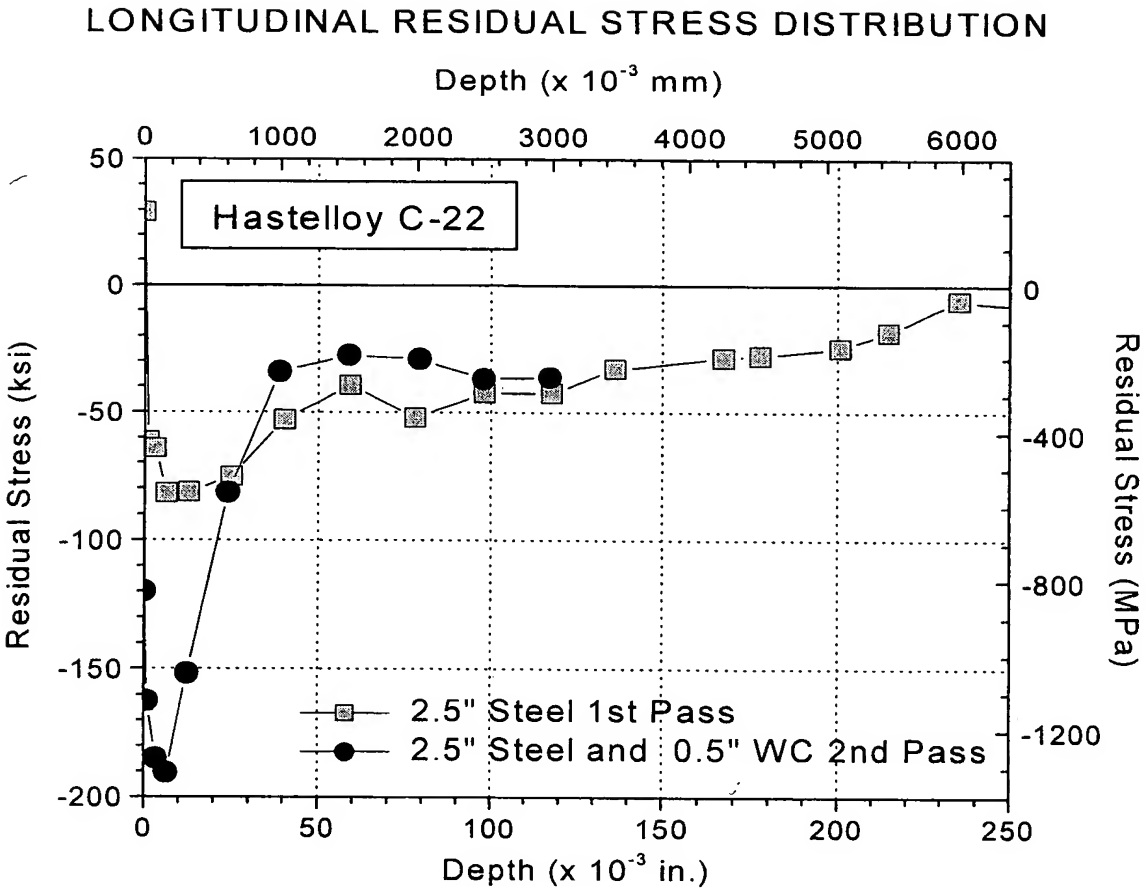

CONTROLLER
116
POSITION
SENSORS
118
POSITIONING
DEVICE
114
PRESSURE
SENSORS
120
COMPRESSION
INDUCING
MEANS
104, 106

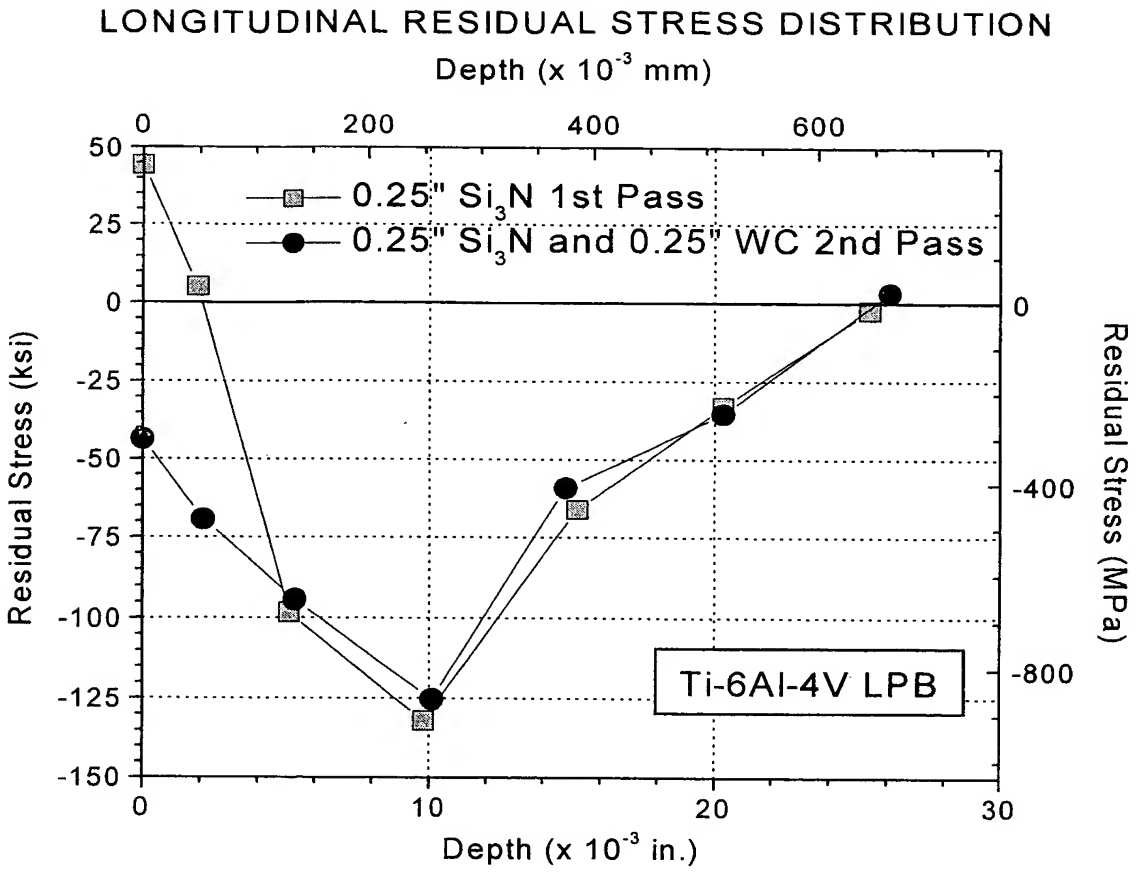
FIG. 6


PERFORMING X-RAY DIFFRACTION TO DETERMINE THE OPTIMUM COMPRESSIVE STRESS PATTERN
210
SELECTING A REGION ALONG THE SURFACE FOR INDUCING A DEEP COMPRESSIVE RESIDUAL STRESSES THEREIN
202
PERFORMING A FIRST OPERATION TO INDUCE DEEP COMPRESSIVE RESIDUAL STRESSES WITHIN THE SELECTED REGION
204
ADJUSTING THE COMPRESSIVE FORCE BEING APPLIED AGAINST THE SURFACE
212
SELECTING A REGION ALONG THE SURFACE FOR INDUCING MORE SHALLOW COMPRESSIVE RESIDUAL STRESSES THEREIN
206
PERFORMING A FIRST OPERATION TO INDUCE DEEP COMPRESSIVE RESIDUAL STRESSES WITHIN THE SELECTED REGION
208



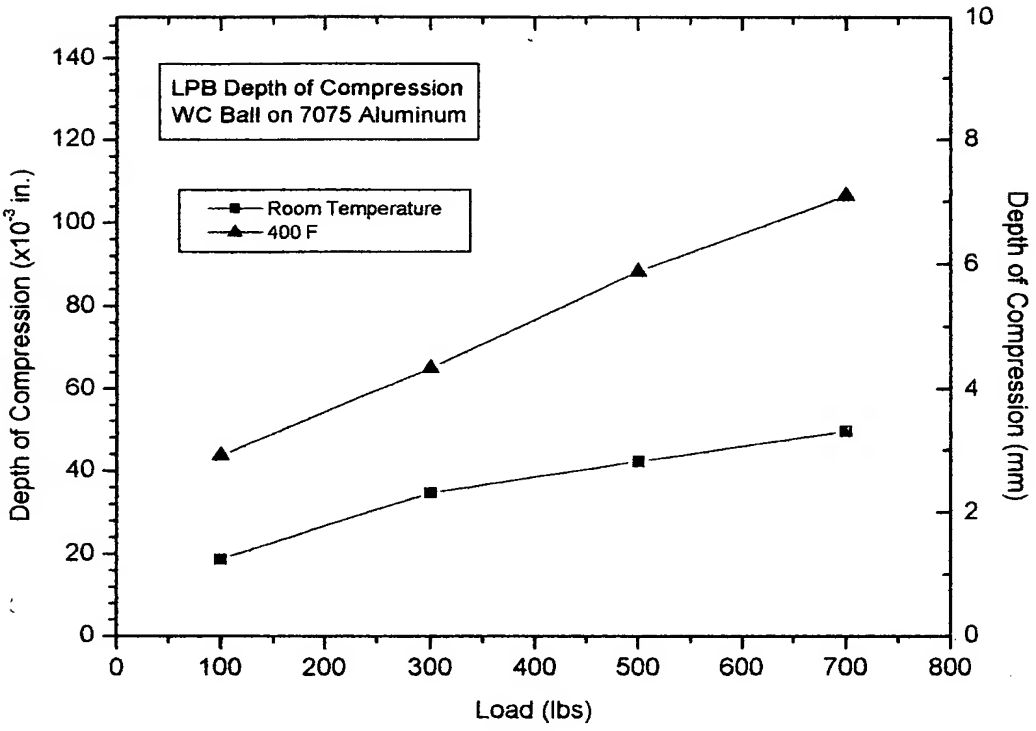
Subsurface residual stress distribution produced by a single-pass burnishing operation compared to the distribution produced by a multi-pass burnishing operation.

FIG. 7



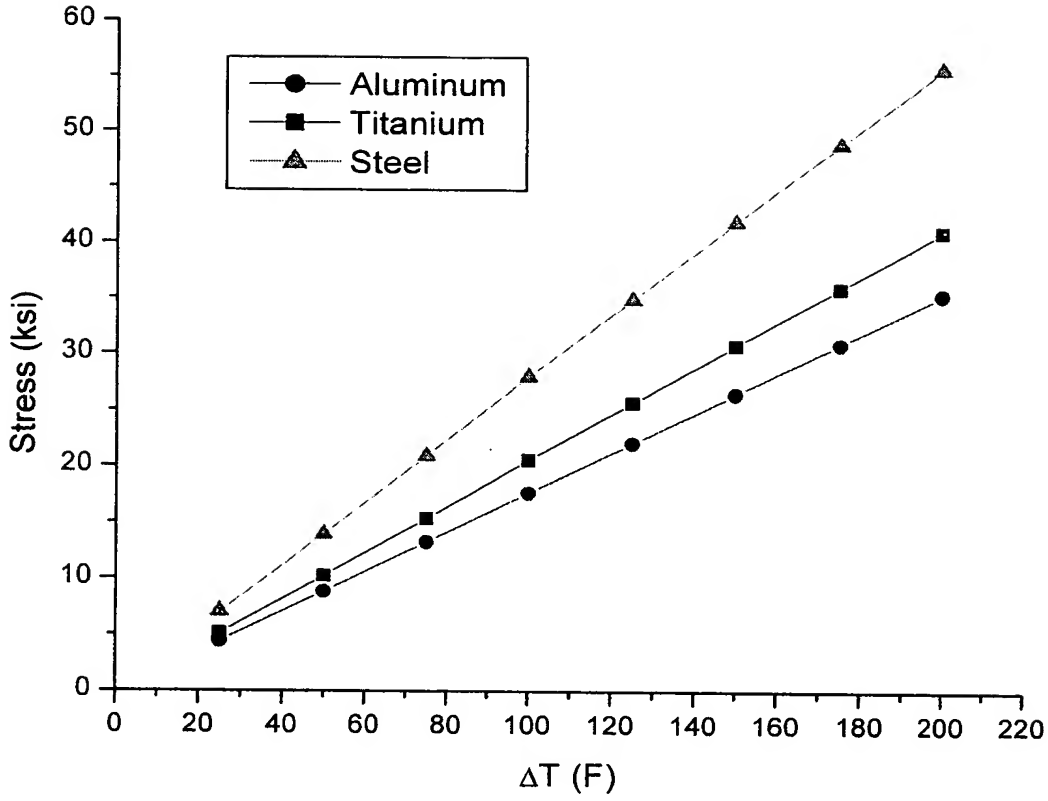
Subsurface residual stress distributions produced by a single pass and a second pass burnishing operation using a higher elastic modulus ball.

FIG. 8



Depth of compression achieved with increasing load in spherical ball burnishing using a 0.75 in. ball at room and elevated temperature of 400° F.

FIG. 9



Surface tensile stress developed by cooling the surface plotted as a function of the temperature differential achieved between the surface and interior.

FIG. 10